Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
WHICH ACCOMMODATES LARGE POWER
SUPPLY VARIATIONS
Sheet 1. of 23 AND THE TOTAL OF THE PARTY OF T Keybd 107 FIGURE 1 Display CPU 105 +3.3 Circuit Board 103 Computer 101

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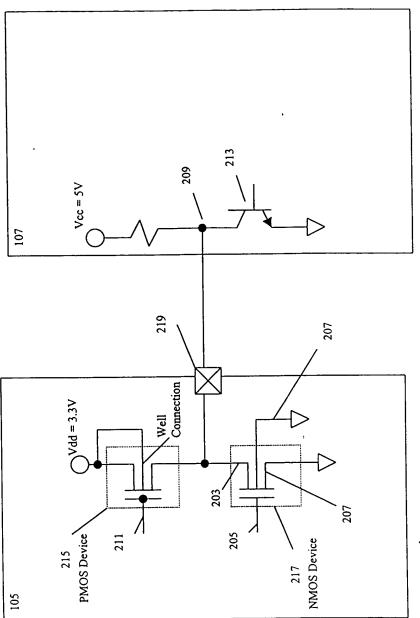


Figure 2 Prior Art

Application No. 10/043,763 Application No. 10/043,763
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Tittle: SUB-MICRON HIGH INPUT VOLTAGE
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WHICH ACCOMMODATES LARGE POWER
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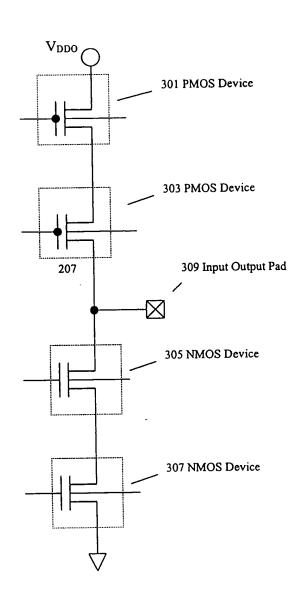


Figure 3

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Titie: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
WHICH ACCOMMODATES LARGE POWER
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Sheet 4. of 23 V_{DDO} 301 400 V_{GP1} Well Biasing Circuit 401 303 402 309 207 305 307

Figure 4

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
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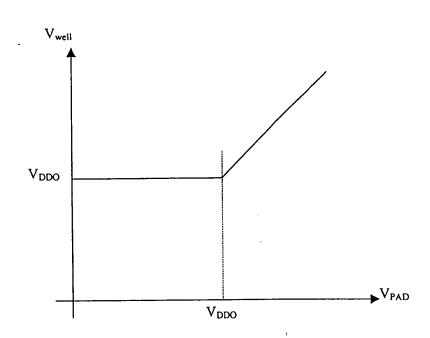


Figure 5

Application No. 10/043,763 Inventor(s): Janardhanan S. Ajit Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
WHICH ACCOMMODATES LARGE POWER
SUPPLY VARIATIONS Sheet <u>6.</u> of <u>23</u> 600 V_{DDO} _3.3 Volts 301 First Bias 407i V_{GP2} Circuit Output Enable 407 403 (OE) Well Biasing P-Type Circuit 40 i V_{DDC} (1.2 Volts) 303 Second Bias D V_{GP1} Circuit V_{DDC} 405 1.2 V 309 207 Output 4 Enable 305 $V_{\text{GN\,I}}$ V_{DDC} V_{DDO} OE Third Bias Bias_Mid Circuit 409 V_{DDP} N-Type Substrate $V_{DDP} = 2.5$ V_{GN2} Fourth 411i -Bias Circuit 307 411 Output Enable

Figure 6

(OE)

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Inventor(s): Janardhanan S. Ajit
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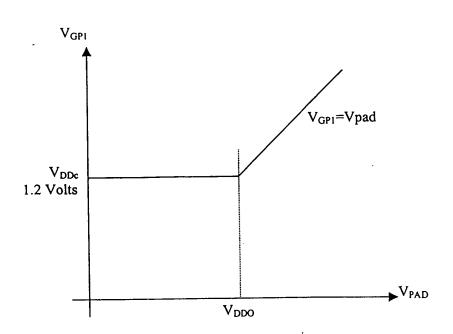


Figure 7

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
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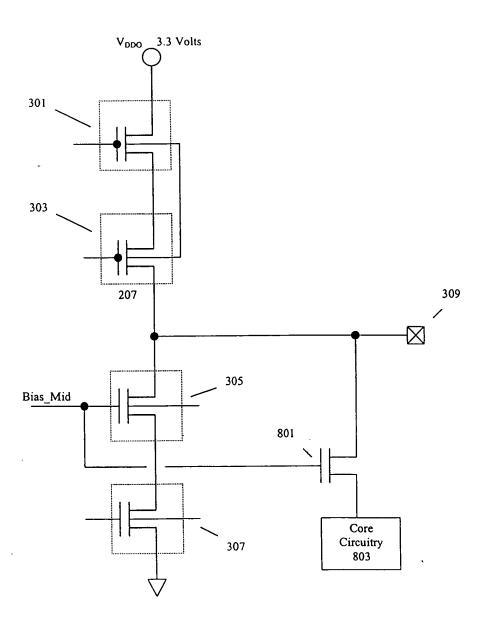


Figure 8

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
WHICH ACCOMMODATES LARGE POWER
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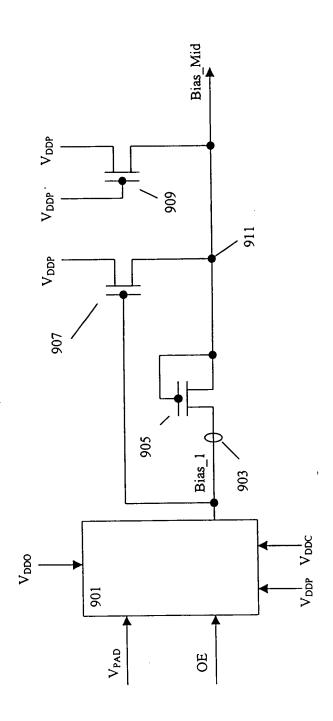
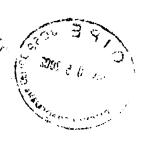


Figure 9A

Application No. 10/043,763

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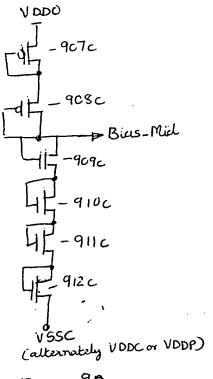


Figure 9B

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
WHICH ACCOMMODATES LARGE POWER
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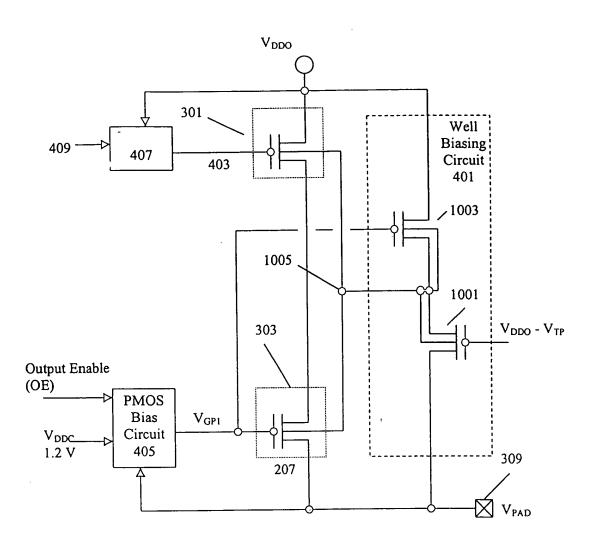


Figure 10

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
WHICH ACCOMMODATES LARGE POWER
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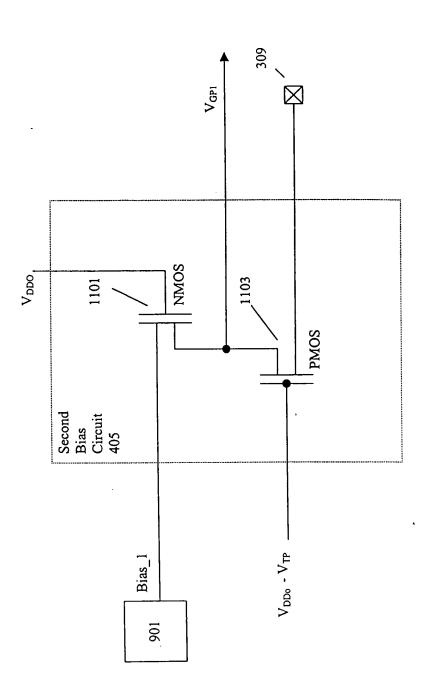


Figure 11A

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
WHICH ACCOMMODATES LARGE POWER
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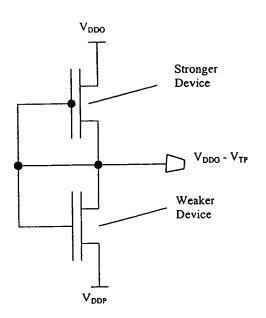


Figure 11B

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
WHICH ACCOMMODATES LARGE,ROWER
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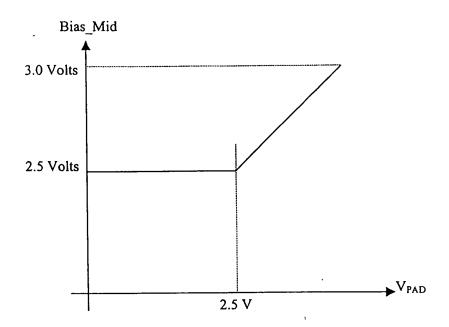
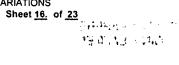


Figure 11C

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
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SUPPLY VARIATIONS Sheet <u>15.</u> of <u>23</u> ABZ NBZ 901 ١

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Title: SUB-MICRON HIGH INPUT VOLTAGE
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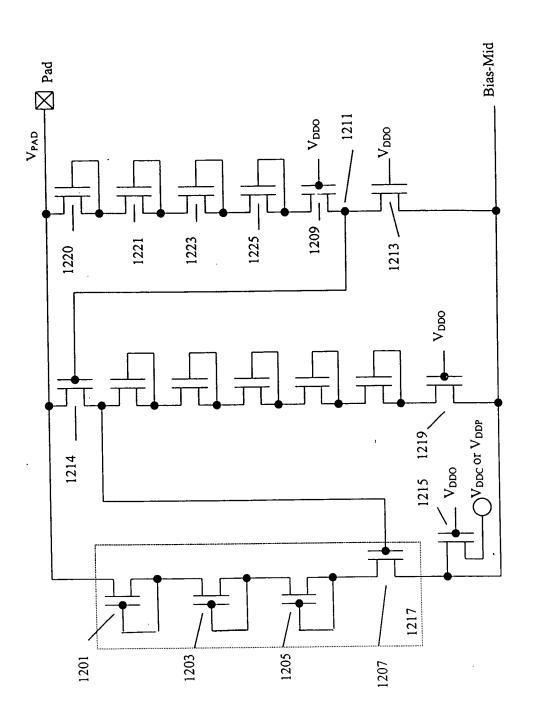


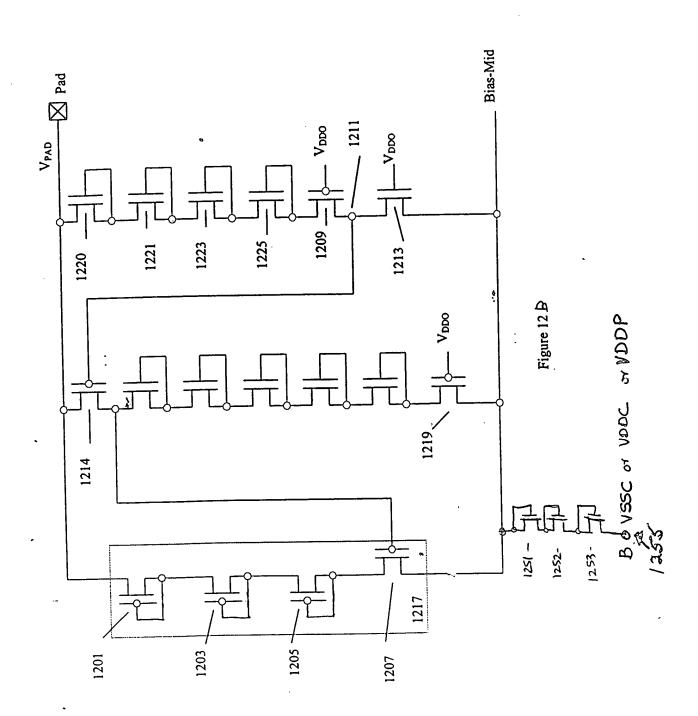
Figure 12A

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
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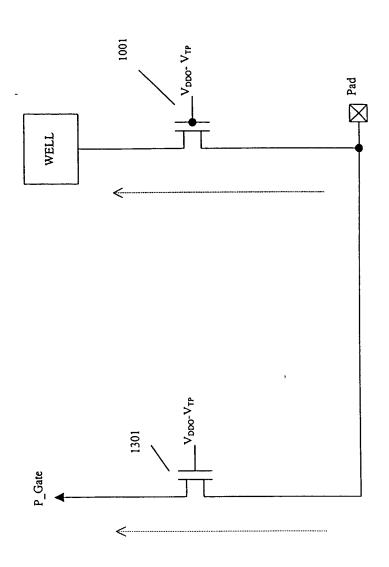
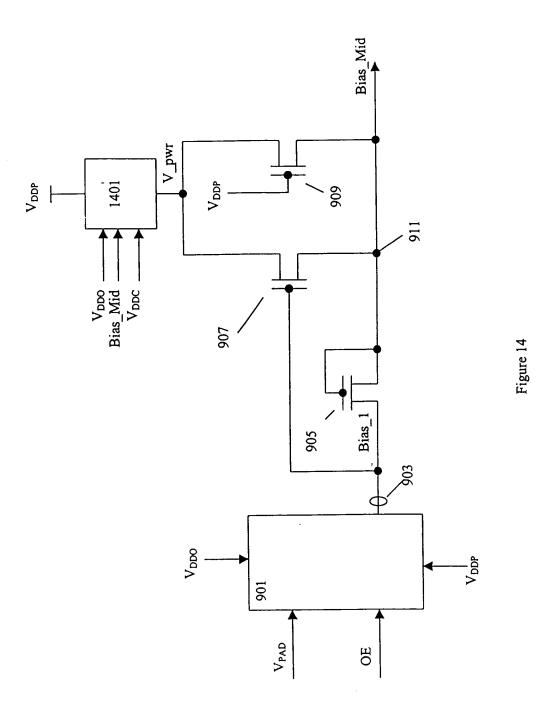


Figure 13

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
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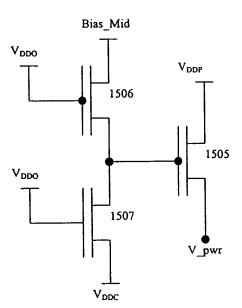


Figure 15

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
WHICH ACCOMMODATES LARGE POWER
SUPPLY VARIATIONS
Sheet 21. of 23 754 787 787 N213 N213 Inlsb1 ١ 1369 1828 1828

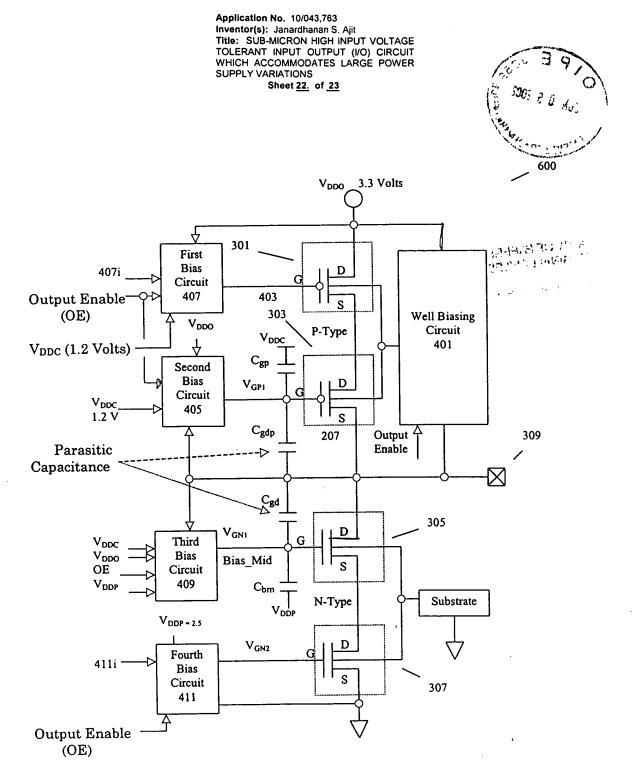


Figure 17

Application No. 10/043,763
Inventor(s): Janardhanan S. Ajit
Title: SUB-MICRON HIGH INPUT VOLTAGE
TOLERANT INPUT OUTPUT (I/O) CIRCUIT
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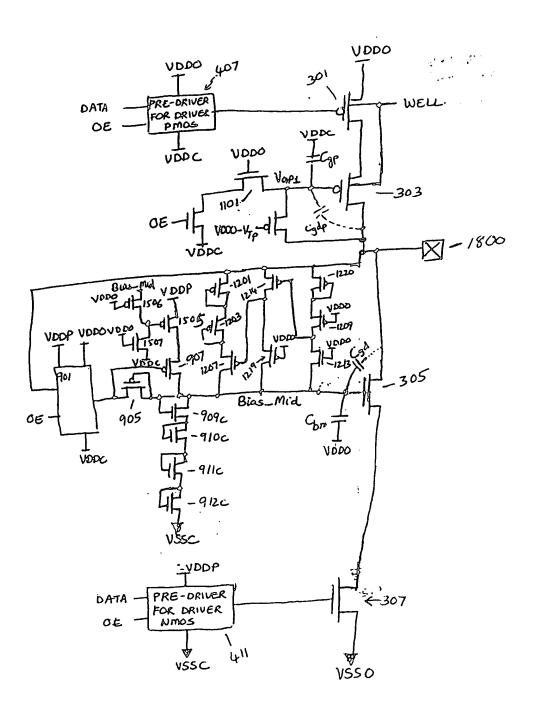


FIGURE 18